

# **A Brief History of HMT and its role in NOAA**

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## A broad need emerged to better link the research community and forecasting in many topics

- 1990's – the weather community recognized there was a need for greater coordination between the weather research community and NWS
- Both **incremental improvements** to existing forecast tools **AND breakthrough advances** that revolutionize forecast operations and skill are required.
- NWS measures advances best by changes in forecast skill
- Scientific community measures progress through evidence of innovation, e.g., peer review papers and inventions
- **TESTBEDS HAVE EMERGED AS A BRIDGE BETWEEN THESE DIFFERING COMMUNITIES**

# Weather-focused Testbeds have been created over the last 10 years

Key applications	Leading NOAA Lab	Partner Labs	Leading NWS recipient	Testbed
Hurricane track and intensity	AOML/Hurricane Research Div.	PSD GSD	National Hurricane Center	Joint Hurricane Testbed (JHT) - 2001
Extreme precipitation	ESRL/Physical Sciences Div.	GSD NSSL	OHD, RFCs, NCEP/HPC	Hydrometeorology Testbed (HMT) - 2003
“Severe” weather, e.g. tornadoes	NSSL	GSD	NCEP/Storm Prediction Center, WFOs	Hazardous Weather Testbed (HWT) - 2003
Mesoscale modeling	ESRL/Global Systems Div.	NCAR	NCEP/Environmental Modeling Center	Developmental Testbed Center(DTC) - 2003

The U.S. Weather Research Program has helped seed these and other testbeds since 2000 (see <http://www.esrl.noaa.gov/research/uswrp/testbeds/> for links to several testbeds)

# NOAA Hydrometeorology Testbed (HMT)

- HMT was established in 2003 to address scientific and practical challenges associated with extreme precipitation.
  - accelerate the development and prototyping of advanced hydrometeorological observations, models, and physical process understanding, and
  - foster infusion of these advances into forecasting operations of the NWS, and to support the broader user community's needs for 21st Century precipitation information.
- HMT addresses these requirements through innovation, demonstration and infusion.
- HMT is led by NOAA/ESRL's Physical Sciences Division with partners across NOAA, other agencies and universities.

# Major Stakeholders

- NOAA (OAR Labs, USWRP, NWS/OHD, River Forecast Centers, WFOs, NCEP, NESDIS)
- California DWR
- California Energy Commission
- Scripps Institution of Oceanography
- Army Corps of Engineers
- US Geological Survey
- Sonoma County Water Agency
- RENCI

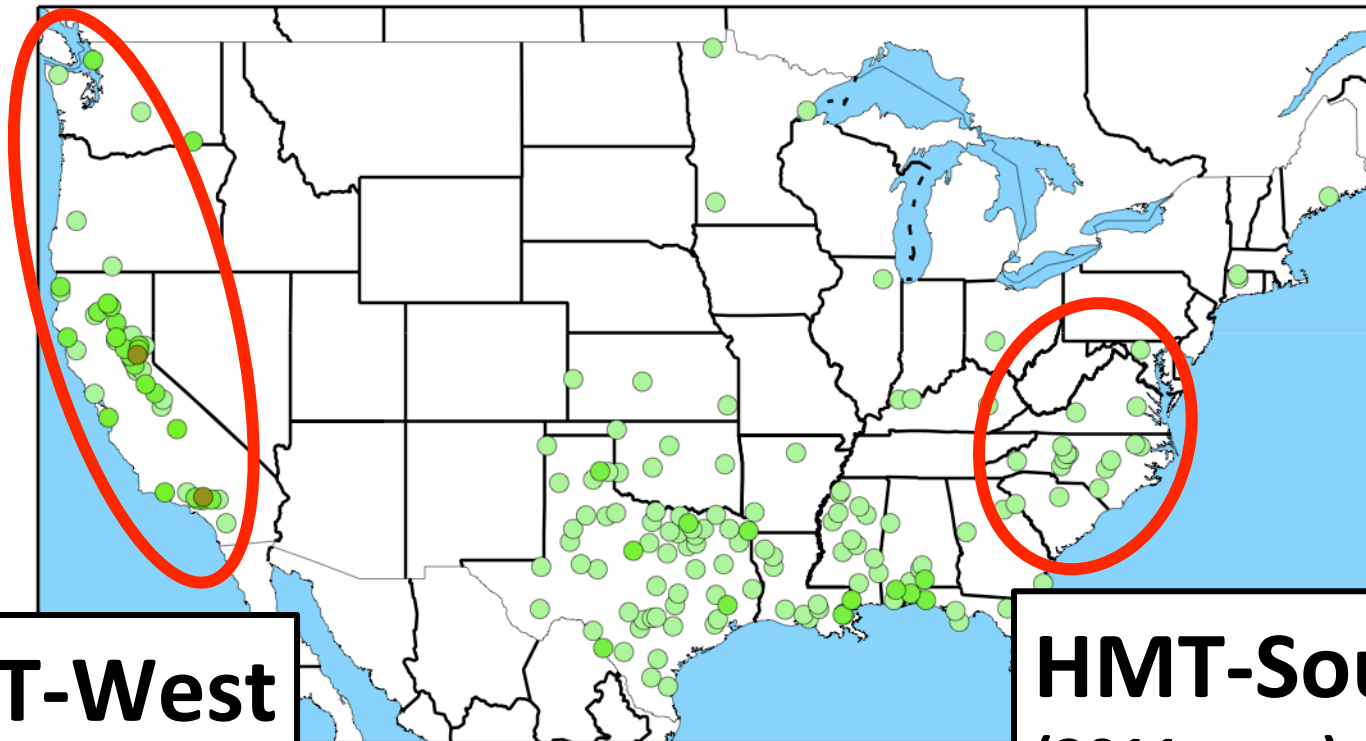
# HMT Funding

- Has ramped up from
  - \$500 K in 2003 to
  - \$5000 K in 2010
  - Additional leveraging (supercomputing, CalWater, NASA...)
- Roughly half of the current investment is in the form of NOAA Research core staff and facilities (mostly PSD)
- Roughly half is from Project funds (3 main projects – USWRP, WRDA, DWR)
- In FY11, The President requested an additional \$7.7 M/year research base funds:
  - \$5.0 M to strengthen and extend HMT's core capabilities (i.e., long-term staff and equipment;; create HMT-SE; ensure continued efforts in the West),
  - \$1.45 M to advance numerical weather modeling via THORPEX,
  - \$1.2 M to link hydrologic stream forecasts to estuaries via CERIS

# New Directions for HMT

- Establish HMT-Southeast
  - Intensive planning over the last 2 years
  - Tim Schneider will lead the implementation
  - Major partnership with NASA
- Emerging climate applications
  - Key capability within NOAA Climate Service & links to NWS
  - Lessons from HMT will inform a Hydroclimate Testbed
  - CalWater experiment w/California Energy Commission
  - Coordination w/NIDIS Pilot studies (CA, CO, & SE US)

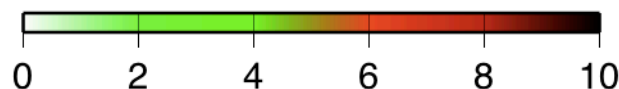
**HMT's regional implementations started in California, have been extended to the Pacific Northwest, and are beginning in the Southeast.**



**HMT-West**  
(2003/4 start)

**HMT-Southeast**  
(2011 start)

COUNT





# **“Water” is an emerging “NOAA Science Grand Challenge”**

- A formal NOAA report “**Strengthening NOAA Science,**” was developed from input across NOAA and was released by NOAA’s Administrator, Dr. Jane Lubchenko in August 2010. The following was identified as a “Grand Challenge”
- ***“Improve understanding of the water cycle*** at global to local scales to improve our ability to forecast weather, climate, water resources and ecosystem health.”

*Thank you for your interest , participation  
and support of HMT!*

# Weather-focused Testbeds have been created over the last 10 years

Testbed	Leading NOAA Lab	Partner Labs	Leading NWS recipient	Key applications
Joint Hurricane Testbed (JHT)	New core funds \$1.5 M started in 2001			
Hydrometeorology Testbed (HMT)	New core funds \$5.0 M starting in 2011			
Hazardous Weather Testbed (HWT)	New core funds \$2.8 M started in 2009			
Developmental Testbed Center(DTC)	New core funds \$3.0 M started in 2010			

The U.S. Weather Research Program has helped seed these and other testbeds since 2000 (see <http://www.esrl.noaa.gov/research/uswrp/testbeds/> for links to several testbeds)

# **Testbeds Help Connect Research to NWS Forecast Operations**

- **Testbeds can help, particularly with**
  - Creating partnerships at the forecaster/researcher level
  - incremental improvements in existing forecast tools and
  - Developing and field testing high-risk/high-reward options that have the potential to create breakthrough advances
- **Testbeds have taken different forms depending on the forecast problem and state of the science/technology, e.g.,**
  - Hurricane prediction is very centralized, while severe weather warnings are local
  - QPE depends on advancing observing systems, while HWRF is a key for hurricanes

# Linking Science, Technology & Infusion Performance Measures to NOAA GPRA Measures

Today's predictive services exist on  
a foundation of earlier innovation in science and technology

